Potential Electricity Sector Needs for PM-10 ERCs in SCAQMD

IEPR Workshop

California Energy Commission

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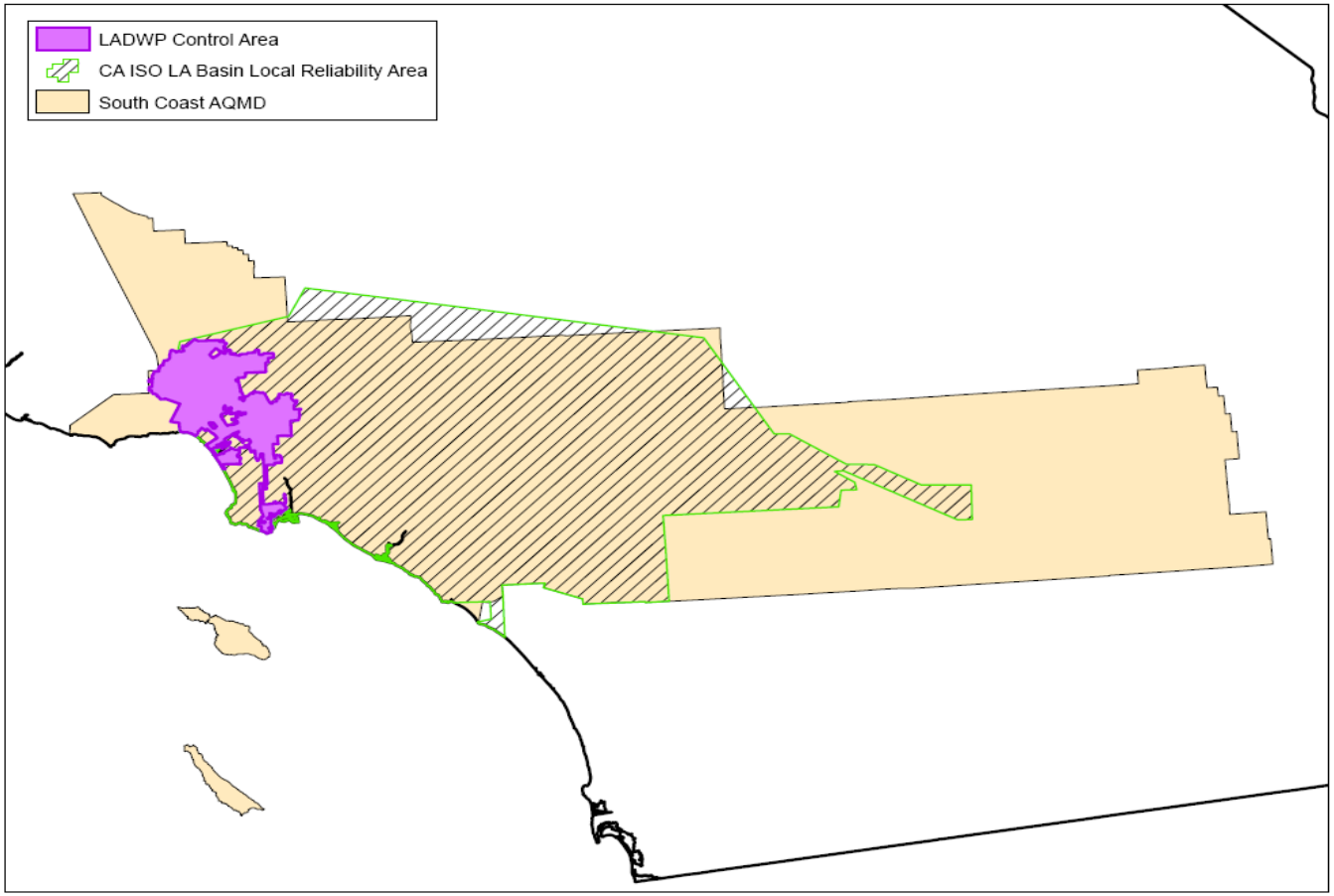
Goals of Workshop

- Refine Understanding of Planning Issues…
  - Identify potential range of need for capacity in the Los Angeles basin, drivers
  - Identify studies necessary to determine the need for new capacity in the Los Angeles Basin
- ...and of Emission Reduction Credit Issues
  - Drivers of the demand for ERCs by individual generation facilities
  - Options for generating and procuring ERCs/offsets
- Identify key follow-up topics

Los Angeles Basin LRA

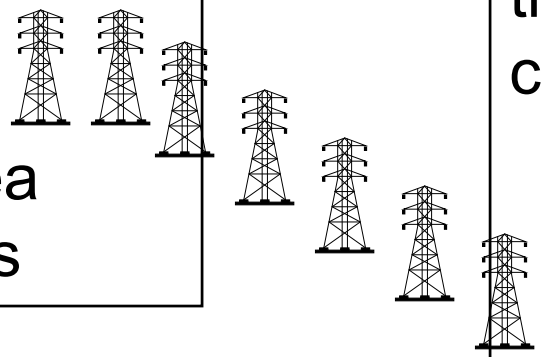


Conceptual piece of cake…

Los Angeles Basin –

Sufficient capacity, with the right dispatch characteristics

- To meet LCR
- To meet sub-area constraints



Rest of So Cal–

Sufficient capacity, with the right dispatch characteristics

- To meet So Cal-wide capacity requirements
- To meet system inertia needs
- To meet system ramping requirements

Uncertainties…

- How many existing in-basin plants can continue to operate
- Transmission upgrades and their impact on LCR, sub-area commitment requirements
- Timing and nature of renewable additions
- Demand growth; effectiveness of energy efficiency, demand response programs

Translating Capacity Additions into ERC Needs

- PM-10 is the constraining pollutant
- Market-sourced ERCs are scarce and extremely expensive
- SCAQMD's ability to issue offsets through Rule 1304 exemptions (for repowerings) and Rule 1309.1 (priority reserve) has been precluded by litigation
- ERC needs for new power plants are not well understood
  - How are limits on monthly operation set?
  - What are the relative ERC needs for peaking vs. load-following units?
  - What latitude exists for reducing the amount of ERCs needed by a fixed amount of generation capacity?

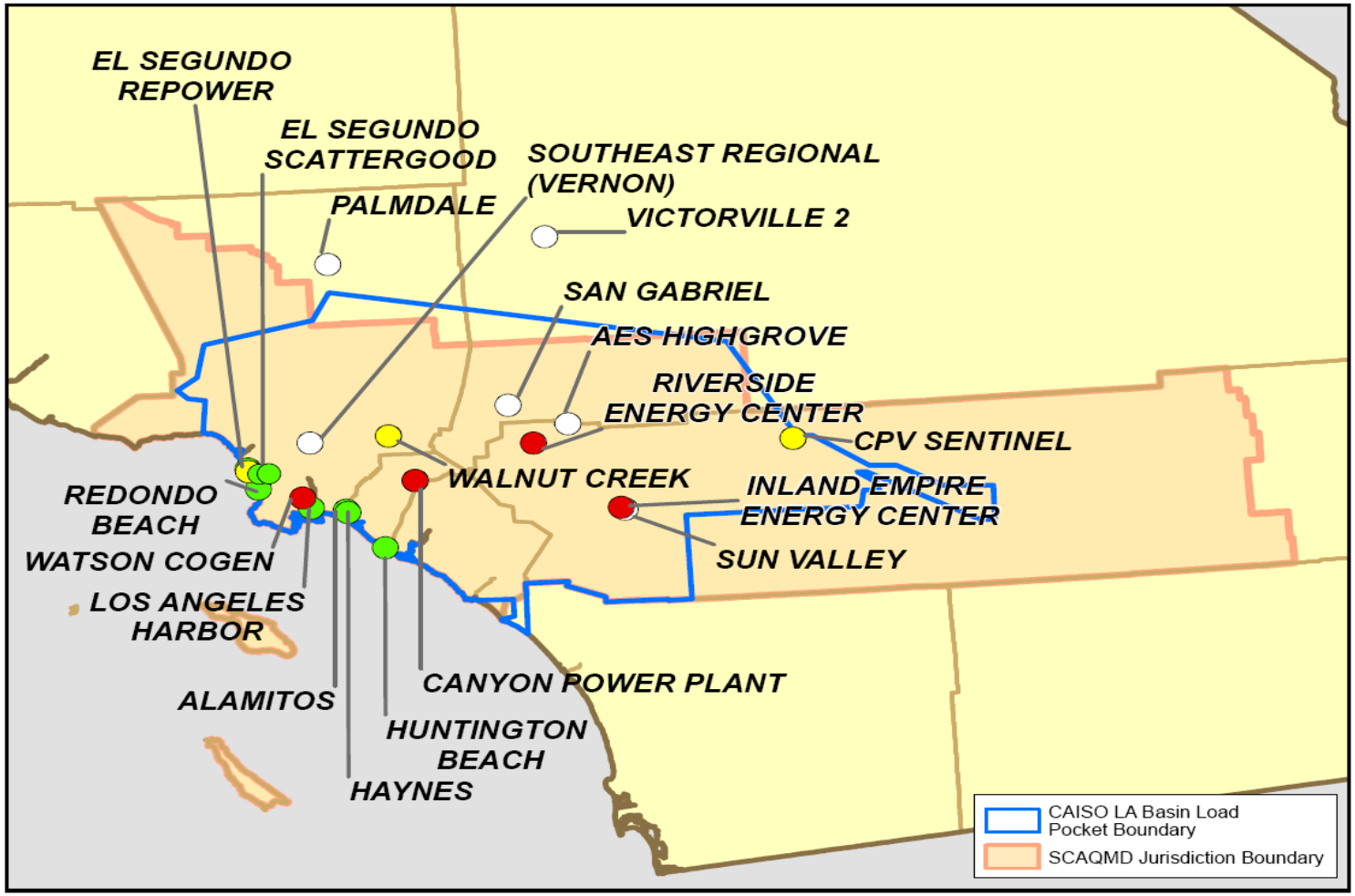
OTC Plants

- ISO's Los Angeles Basin LRA (7,219 MW)
  - Alamitos (2056 MW)
  - El Segundo (670 MW)
  - Huntington Beach (904 MW)
  - Redondo Beach (1343 MW)
  - San Onofre (2,246 MW)
- LADWP (2,579 MW)
  - Harbor (224 MW)
  - Haynes (1, 569 MW)
  - Scattergood (803 MW)

Timelines…

- 2010 – Compliance plans filed by all OTC plants
- 2011 – Exclusion screens, cessation of intake flows unless generating or performing maintenance
- 2015 – Mitigation of impingement and entrainment impacts
- 2015 – El Segundo, Haynes compliant
- 2017 – Harbor, Scattergood compliant
- 2020 – Alamitos, Redondo Beach, Huntington Beach compliant
- 2021 – Diablo Canyon compliant
- 2022 – San Onofre compliant

Map of Power Plants



Plants waiting…

- Stalled projects with contracts
  - Walnut Creek (500 MW)
  - CPV Sentinel (850 MW)
  - El Segundo Repower (560 MW)
- Stalled projects without contracts
  - Highgrove (300 MW)
  - San Gabriel (696 MW)
  - Southeast Regional Energy Center (300 MW)
  - Sun Valley(500 MW)
- Stalled projects outside Los Angeles Basin LRA
  - Victorville II (563 MW)
  - Palmdale (617 MW)

LADWP

- Planned replacements of Haynes 5, 6 and Scattergood 1, 2
- Uncertainty regarding ability to continue operating other units
- Local capacity needs; limited ability to replace other units, implement transmission solutions

Illustrative SP-26 Supply Demand Balance (MW)

	2010	2011	2012	2013	2014	2015	2016	2017	2020
Peak Demand	27,880	28,289	28,794	29,221	29,553	29,904	30,261	30,656	31,813
Existing Generation	22,927	22,927	22,927	22,927	22,927	22,927	22,927	22,927	22,927
Net Imports	10,100	10,100	10,100	10,100	10,100	10,100	10,100	10,100	10,100
DR & Interruptible	1,491	1,512	1,534	1,547	1,551	1,553	1,555	1,556	1,560
New Thermal	995	1,707	1,992	1,992	1,992	1,992	1,992	1,992	1,992
New Renewable	162	251	533	965	1,157	1,454	1,743	1,743	1,743
Retirements	(354)	(354)	(354)	(354)	(708)	(708)	(708)	(708)	(708)
Total Generation	35,321	36,142	36,731	37,177	37,020	37,318	37,608	37,610	37,614
Reserve Margin	27%	28%	28%	27%	25%	25%	24%	23%	18%
Surplus over 15%	**3,259**	**3,609**	**3,618**	**3,573**	**3,034**	**2,928**	**2,808**	**2,356**	**1,028**
SWRCB Retirements						(670)	(670)	(1,620)	(7,953)
Reserve Margin						23%	22%	17%	-7%
Surplus over 15%						**2,258**	**2,138**	**736**	**(6,925)**

Assumed Additions

- Total of 1,992 MW
  - Inland Empire Unit 2 (405 MW)
  - Riverside Energy Center expansion (96 MW)
  - Canyon (200 MW)
  - Watson Cogen (85 MW)
  - Blythe 1 (520 MW)
  - Otay Mesa (590 MW)
  - Orange Grove (96 MW)

The LA Basin has sufficient capacity for the moment….

- Supply is in excess of current LCR requirements
- LRA contains 11,943 MW of generation capacity, 10,720 MW provided RA in summer 2009
- 2010 LCR of 9,735 MW will rise with load growth, will fall due to transmission upgrades.
- This assumes that there are no OTC policy-induced retirements.

Supply exceeds local capacity requirements for now…

	2010	2011	2012	2013	2014	2015	2016	2017	2020
LCR	**9,735**	**10,019**	10,266	**8,585**	8,888	9,129	9,385	9,649	10,488
Existing Generation	11,943	11,943	11,943	11,943	11,943	11,943	11,943	11,943	11,943
New Thermal	405	501	786	786	786	786	786	786	786
New Renewable	45	87	129	175	217	224	224	224	224
DR /Interruptible	984	985	996	1,005	1,008	1,009	1,010	1,010	1,012
Total Generation	13,377	13,516	13,855	13,910	13,955	13,962	13,963	13,963	13,965
Surplus above LCR	**3,642**	**3,497**	**3,588**	**5,325**	**5,066**	**4,833**	**4,578**	**4,314**	**3,477**
SWRCB Retirements	0	0	0	0	0	(670)	(670)	(670)	(4,927)
Surplus above LCR						**4,163**	**3,908**	**3,644**	**(1,450)**

A Big But…(actually three)

- Grid stability in the Los Angeles Basin requires the commitment of units in specific sub-areas in the basin under high load conditions
- Generation on-line in Southern California must provide sufficient inertia to sustain imports.
- System must have sufficient ramping capability to absorb intermittent resources.

Committed Capacity Requirements in the LA LRA

- Grid stability in the Los Angeles Basin requires the commitment of increasing amounts of capacity in specific sub-areas in the basin under as loads increase.
- To meet a local area generation constraint for Orange County
- To meet a local area generation constraint for South of Lugo
- Existing capacity cannot be retired in amounts and at locations that would threaten being able to satisfy these constraints unless it is replaced

Inertia – The SCIT Nomogram

- Sufficient generation must be operating in Southern California to provide inertia needed to sustain imports.
- Inertia varies by technology; steam turbines provide exceptionally large amounts.
- Existing capacity cannot be retired in amounts that would threaten being able to satisfy these constraints; replacement capacity would be necessary to make up any shortfall.

System Ramping Capability

- Increased reliance on intermittent resources may increase the peak-trough ratio and thus the amount of capacity needed for the morning and evening ramps.
- Need for ramping capacity will depend upon the composition of renewables
- Existing capacity cannot be retired in amounts that would threaten being able to satisfy these constraints; replacement capacity would be necessary to make up any shortfall.